



# What Makes a Food Nutritious?

## Overview – Activity ID: 8608

Students will analyze select nutritional values of specific food products and then compare those values to the recommended daily allowances published by the U.S.D.A. They will calculate percentages and fractions based upon the information they find.

## Math Concepts

- percents
- fractions

## Materials

- TI-30XS MultiView™
- pencil

## Activity

Begin by asking the entire class a question about the nutritional value of a specific item, to get them intrigued in this activity.

*You are trying to eat healthier by lowering your fat intake, and you are not sure what to eat for a snack. Your choices are a 3-oz bag of animal crackers, a cup of vanilla yogurt, a 4-oz bag of granola, or an energy bar. What is the best choice for you?*

On average, the animal crackers have 5 g of fat, the vanilla yogurt has 1.5 g, granola has 44 g, and an energy bar has 3 g. These numbers can, of course, vary tremendously depending upon brand, ingredients, etc., but this serves as a guideline for discussion.

*The vanilla yogurt is the best option since it has only 1.5 g of fat. How many of you were surprised at the large amount of fat in an average serving of granola? On the other hand, how many of you were surprised at how little fat an energy bar contained? What is a reasonable amount of fat to consume in a day?*

Show the students the 2005 Daily Values and Percent Daily Values recommendations from the U.S.D.A. There is a transparency master for classroom projection included at the end of this activity.

*These are some of the recommendations published by the U.S.D.A., based upon a 2,000-calorie daily intake. At most, a person should consume 65 g of fat daily. How does the snack you selected follow this recommendation?*

Discuss why a person should consume “at most” 65 g of fat. Would it make sense if the recommended Daily Value was “at least” 65g? No, because that would mean people could eat all the fat they wanted and still be healthy.

*If you wisely chose the serving of yogurt, what fraction of your daily fat allowance would you have consumed? What percentage of your daily fat allowance would you have consumed?*



# What Makes a Food Nutritious?

Use the TI-30XS MultiView™ to easily analyze and convert between fractions and percents.

The 1.5 g out of a recommended 65 g can be written as a fraction. We'll first use the calculator's functionality to change this fraction from  $\frac{1.5}{65}$  to  $\frac{3}{130}$  because decimals are typically not used within fractions. Then, by using the Convert to Percent feature, we can see that 1.5 g is about 2.3% of one's daily recommended amount of fat. Is this a lot? A little? Explain.

Calculate the percentage of the daily fat allowance if the students chose the granola instead of the yogurt.

We can easily follow the same process to find the percentage of your daily fat allowance that a serving of granola would contain. The granola contains close to 68% of your daily allowance! How does this compare to the yogurt?

Now, move on to interpreting a packaging label. A transparency master for classroom projection is included at the end of this activity.

Let's look at a sample label for a small bag of cookies and analyze its nutritional value. First, it's important to look at the number of servings per package. In this bag, there are two servings. Assuming you eat the whole bag, you must remember to double the figures.

What fraction of your daily fat allowance would you have consumed if you normally consume 2,500 calories daily? What percentage of your daily fat allowance would you have consumed?

Point out that the recommended consumption has changed since we're now considering a daily intake of 2,500 rather than 2,000 calories.

The 24 g out of a recommended 80 g can be input as  $\frac{24}{80}$ , which the calculator will promptly simplify to  $\frac{3}{10}$ . In this case, we don't need to use the calculator to convert our fraction to a decimal. We can easily see that 24 g of fat is 30% of the recommended daily allowance. Explain.

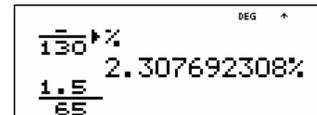
Follow these steps:

1. Press 1  $\frac{\square}{\square}$  5  $\frac{\square}{\square}$  6 5  $\rightarrow$  **enter**.
2. Press  $\leftarrow$  to display the fraction rather than the decimal approximation.
3. Now press **2nd**  $\left[\rightarrow\%$  **enter**.
4. The screen should show this:

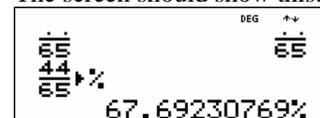


Follow these steps:

1. Press  $\ominus$  6 times, or until your initial fraction from the previous example is highlighted.
2. Press **enter** to paste that fraction onto a new entry line.
3. The screen should show this:



4. Press  $\uparrow$   $\leftarrow$   $\downarrow$   $\downarrow$  4 4 **delete** to change the numerator.
5. Press **enter** then **2nd**  $\left[\rightarrow\%$  **enter** to convert to a percent.
6. The screen should show this:



Follow these steps:

1. Press 24  $\frac{\square}{\square}$  80  $\rightarrow$  **enter**.
2. The screen should show this:





# What Makes a Food Nutritious?

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Fat is a nutrient people need to limit in their diets. As mentioned earlier, the recommended Daily Allowance is “at most” the amount listed on the label. However, some of the nutrients are more beneficial, and the students need to see an example of a nutrient they should try to get enough of each day. Let’s look at calcium.

*Calcium is a crucial nutrient, so let’s look at the calcium content of these cookies. First, notice there is a Percent Daily Value given, but no gram amount. Different people need different amounts of calcium daily. This percent is based upon the needs of an average adult.*

*Each serving of cookies contains 20% of the recommended daily value of calcium. This means if you eat the entire bag, which is two servings, you will have consumed 40% of the recommended daily value.*

*How many servings would you need to eat to get your entire recommended intake of calcium? Is this a good idea? Explain.*

# What Makes a Food Nutritious?

Name \_\_\_\_\_

Date \_\_\_\_\_



- The label at the right shows the nutrition facts for a snack-sized bag of crunchy cheese sticks. Assume you are eating a 2,500-calorie diet daily. If you eat one serving of crunchy cheese sticks, what fraction of your daily fat allowance will you consume?
- Taking into account that this is a snack-sized bag, chances are good that you will eat the entire bag and not just one serving. If you do eat the whole bag, how many grams of fat will you consume?

<b>Nutrition Facts</b>	
Serving Size 1 oz. (28g/About 21 pieces)	
Servings Per Container About 2	
<b>Amount Per Serving</b>	
<b>Calories</b> 170	Calories From Fat 110
% Daily Value*	
<b>Total Fat</b> 11g	<b>17%</b>
Saturated Fat 1.5g	<b>8%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 250mg	<b>10%</b>
<b>Total Carbohydrate</b> 14g	<b>5%</b>
Dietary Fiber less than 1g	<b>2%</b>
Sugars 0g	
<b>Protein</b> 2g	
Vitamin A 2%	* Vitamin C 0%
Calcium 0%	* Iron 4%
Vitamin E 6%	* Thiamin 4%
Riboflavin 2%	* Niacin 4%
Vitamin B <sub>6</sub> 2%	* Phosphorus 2%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram:	
Fat 9	* Carbohydrate 4 * Protein 4

What fraction of your daily fat allowance is that?

- What percentage of your daily fat allowance is in the entire bag?

- A food is considered
  - a poor source of any given nutrient if it has 5% or less of the recommended daily amount for that nutrient
  - a good source of a nutrient if the food contains 10-20% of the recommended daily amount for that nutrient
  - high in a particular nutrient if the food contains more than 20% of the recommended daily amount for that nutrient

Given this information, is this bag of crunchy cheese sticks a good source of fat if you eat the entire bag? Explain.

- Vitamin E is considered an essential nutrient. What percentage of your daily value of Vitamin E would you get if you consumed this entire bag of crunchy cheese sticks?

# What Makes a Food Nutritious?

Name \_\_\_\_\_

Date \_\_\_\_\_



6. Assume you ate the entire bag of crunchy cheese sticks and that you consume 2,500 calories per day. Complete the table below, using your TI-30XS MultiView™ to convert from fractions to percents.

Nutrient	Amount	Fraction of daily value	Percent of daily value
Cholesterol			
Sodium			
Carbohydrate			
Fiber			

7. Consider the percent of your daily values of fat, cholesterol, sodium, carbohydrates, fiber, and Vitamin E represented by the bag of crunchy cheese sticks. Is this snack nutritious or not? Explain.



# What Makes a Food Nutritious?

## ANSWER KEY

1. The label at the right shows the nutrition facts for a snack-sized bag of crunchy cheese sticks. Assume you are eating a 2,500-calorie diet daily. If you eat one serving of crunchy cheese sticks, what fraction of your daily fat allowance will you consume?  $\frac{11}{80}$

2. Taking into account this is a snack-sized bag, chances are good that you will eat the entire bag and not just one serving. If you do eat the whole bag, how many grams of fat will you consume? 22 g

What fraction of your daily fat allowance is that?  $\frac{22}{80}$

3. What percentage of your daily fat allowance is in the entire bag? 27.5%
4. Given this information, is this bag of crunchy cheese sticks a good source of fat if you eat the entire bag? Explain. 27.5% is considered high since it's more than 20%. Fat is one of the nutrients for which people should attempt to eat at most their recommended daily amount. Being high in fat is not a good thing for a food to be, and therefore this snack is not a "good" source of fat.
5. Vitamin E is considered an essential nutrient. What percentage of your daily value of Vitamin E would you get if you consumed this entire bag of crunchy cheese sticks? 12%
6. Assume you ate the entire bag of crunchy cheese sticks and that you consume 2,500 calories per day. Complete the table below, using your TI-30XS MultiView™ to convert from fractions to percents.

Nutrient	Amount	Fraction of daily value	Percent of daily value
Cholesterol	0 mg	0/300	0
Sodium	500 mg	500/2,400	20.8
Carbohydrate	28 g	28/375	7.5
Fiber	<2 g	Any answer between 0/30 and 2/30 is acceptable.	Any answer between 0 and 7 is acceptable.

7. Consider the percent of your daily values of fat, cholesterol, sodium, carbohydrates, fiber, and Vitamin E represented by the bag of crunchy cheese sticks. Is this snack nutritious or not? Explain. This snack is not nutritious. It provides large percentages of the daily values of several nutrients that need to be limited, such as sodium and fat, yet provides very little of the daily values of vitamins or fiber.

# What Makes a Food Nutritious?

## Transparency

<u>Nutrient</u>	<u>DV</u>	<u>% DV</u>
Total fat	65 g	100
Saturated fat	20 g	100
Cholesterol	300 mg	100
Sodium	2,400 mg	100
Total carbohydrate	300 g	100
Dietary fiber	25 g	100

<b>Nutrition Facts</b>		
Serving Size 1 cup (228g)		
Servings Per Container 2		
<b>Amount Per Serving</b>		
<b>Calories</b> 250	Calories From Fat 110	
<b>% Daily Value*</b>		
<b>Total Fat</b> 12g		<b>18%</b>
Saturated Fat 3g		<b>15%</b>
Trans Fat 1.5g		
<b>Cholesterol</b> 30mg		<b>10%</b>
<b>Sodium</b> 470mg		<b>20%</b>
<b>Total Carbohydrate</b> 31g		<b>10%</b>
Dietary Fiber 0g		<b>0%</b>
Sugars 5g		
<b>Protein</b> 5g		
Vitamin A		4%
Vitamin C		2%
Calcium		20%
Iron		4%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:		
	Calories:	2,000    2,500
Total Fat	Less than	65g    80g
Sat Fat	Less than	20g    25g
Cholesterol	Less than	300mg    300mg
Sodium	Less than	2,400mg    2,400mg
Total Carbohydrate		300g    375g
Dietary Fiber		25g    30g